Carpet Issue Paper
2001 JTR Recycling Market Development Roundtable

Introduction

The purpose of this paper is to provide a summary of the carpet discussion which took place at the Recycling Market Development Roundtable in June 2001. The discussion focused on potential solutions and collaborative efforts to address market barriers and capitalize on opportunities to expand markets for end of life carpet.

Current Situation

It is estimated that approximately 4 billion pounds of carpet are discarded every year in the United States, accounting for 1.1% of all municipal solid waste by weight, or about 2% by volume. The carpet originates from both commercial (35%) and residential (65%) sources, and is primarily landfilled. Nylon 6,6 represents 40% of all carpet fibers discarded, while nylon 6 represents 30%, PET 10% and Olefin (polypropylene) 15%. Several commercial carpet manufacturers maintain their own recycling programs to support replacement business. In general, there are currently very limited secondary markets for carpet.

Summary of Existing Initiatives

Midwestern Workgroup on Carpet Recycling	With participation from seven states, the Midwestern Workgroup is working to increase carpet reuse and recycling through product stewardship. Participants include Minnesota, North Carolina, California, Maryland, Massachusetts, Iowa, and the Northeast Recycling Council. The workgroup's efforts, which are scheduled to conclude in August 2001, have resulted in an MOU with the carpet industry with several "negotiated outcomes": Industry will fund and manage Carpet America Recovery Effort (CARE), a third party organization responsible for achieving the negotiated outcomes to increase carpet reuse and recycling. This concept is supported by the Carpet and Rug Institute. Government and industry will work collaboratively to establish a "rates and dates" structure for carpet. National targets for reuse and recycling will be set over a 10-year timeframe, concluding in 2012. Government will begin developing model procurement guidelines for recycled-content carpet to be adopted by public entities nationally, building upon EPA's Comprehensive Procurement Guidelines. Efforts will be made to reward companies who have taken steps toward product stewardship. Outreach will be conducted nationally to promote the procurement guidelines. The Workgroup has taken a voluntary approach to product stewardship, but has left open the possibility of future regulatory action if goals are not met. Visit <http://www.moea.state.mn.us/policy/carpet/index.cfm> for additional background on this project including a project overview, timeline of activities, meeting summaries, and the negotiated outcomes.
Georgia State—Dalton Center for Business Assistance	Working to catalogue products with recovered carpet as feedstock and identify opportunities to use recovered carpet in new products.

Honeywell Georgia Ohio	Manage a carpet recycling facility in Georgia currently at 30 to 50 percent capacity with the potential for growth. The company is looking for recovered Nylon 6 from carpet installers and retailers. Honeywell has also begun to invest in Nylon 6,6 market development. Honeywell is also interested in siting a facility in Ohio to recover used carpet. The company needs a major metropolitan area to supply such a facility. Honeywell has developed an identification system for processing recovered carpet.
WasteNot Arizona Missouri	Based in Phoenix, WasteNot is working to collect used carpet to supply the Honeywell facility in Georgia and possibly Dupont. The company has two collection sites in Arizona, collecting the bulk of its carpet from installers at commercial sites. In May 2001, WasteNot also opened a facility in Missouri and is currently establishing contracts with other companies. WasteNot will provide rolloffs at the building sites to reduce transportation costs. They also plan to process the carpet to reduce its size to make it easier to bale and ship.
Massachusetts	Two recycling companies are currently engaged in dialogue with carpet manufacturers. Based on Massachusetts' experience, most recycling companies prefer to sort the used carpet as close to the source as possible to reduce transportation costs. Thus, the companies are considering where to locate a central site for carpet recovery. Will ban the disposal of unprocessed C&D waste in 2003 and may include carpet. Will take a phased approach toward implementing the ban.
Iowa	Carpet Pad Recovery is providing Honeywell with Nylon 6 and 6,6 and is looking for a secure market for Nylon 6,6. Also, Dupont Flooring Systems has opened 6 to 7 stores around the state offering recycling services to commercial establishments. Dupont's goal is to recycle 25 percent of Iowa's commercial carpet volume. Dupont is working with Flooring Gallery, another Iowa-based company, to offer recycling services to residential accounts for a fee.
North Carolina	Blue Ridge Recycling collects used carpets and carpet pads from 20 to 30 commercial establishments throughout the state through spot trailers and "milk run" pickups. The company is currently upgrading its processing capabilities and is working to expand to service larger commercial institutions. It is partnering with another recycling company so it can bid as a full-service team. Its goal is to establish a firm hold on the carpet collection infrastructure in central North Carolina.
Indiana	The Ogden Martin facility, located in Indianapolis, is supplied by numerous states, including Ohio. Many in the state, however, are encouraging waste-to-energy applications.
Carpet and Rug Institute	Establishing an organization to support research and development of sorting and recycling technologies and participates in the Midwestern Workgroup
Region 4 Task Force	GA, FL, NC, SC are initiating collection pilots and supporting the Midwestern Workgroup efforts
Georgia Institute of Technology	Conducting research on the logistics and economic feasibility of using carpet waste (that cannot be otherwise recycled) as an alternative fuel in cement kilns

Industry	The five largest manufacturers of carpet are Shaw Industries, Mohawk Industries, Beaulieu of America, Milliken and Interface Flooring Systems. The four largest resin manufacturers are Honeywell, DuPont, Solutia and BASF. Some of these companies have established programs to return and recycle their products: **Milliken Carpet** reclaims, refurbishes and re-sells commercial carpet tiles. **Collins & Aikman** collects vinyl-backed carpet tiles from commercial sources for recycling into new backing. Incorporating a range of recovered carpet materials (PVC, PP, latex) into carpet backing. Recovered-content floor covering contains at least 28 percent recovered material and sometimes larger percentages. **Interface Flooring** offers reclamation program for old carpet from commercial sources when new product is installed. Interface also offers a leasing option whereby they will maintain and ultimately take-back carpet at end-of-life. **Honeywell** opened a facility in Augusta, GA to recycle 200 million pounds of nylon 6 annually into new nylon fibers for use in a variety of products. **DuPont** conducts limited recycling of nylon 6,6 collected through its commercial carpeting division. The recycled content products produced include automobile parts and carpet backing. **BASF** collects and recycles BASF carpet at end of life for no fee. BASF also accepts non-BASF carpet for a fee. Non-carpet manufacturer end-users include Pike Companies (MN), MaryAnn Industries (GA), C-Board (GA), Select-Tek (MA), and Blue Ridge (NC).
EPA	The **Extended Product Responsibility** program supports collaborative efforts between manufacturers, generators, collectors, processors and end markets to promote product stewardship for carpets (www.epa.gov/epr) and the **Comprehensive Procurement Guidelines** program (www.epa.gov/cpg) specifies recycled content for PET carpet
Reuse Development Organization	Supporting reuse organizations that accept carpet in good condition at warehouses (www.redo.org)

Significant Barriers

Identifying the different carpet fibers in the processing phase
Lack of markets for Nylon 6,6 (most widely used resin)
Regional markets/geographic challenges since most carpet manufacturers are located in the Southeast
Limited used carpet collection and processing infrastructure nationwide
Unwillingness to change by installers and retailers
Low disposal costs for used carpet
Lack of alternative uses for used carpet
Lack of awareness by manufacturers of importance of "design for recycling"
Disconnects along the recycling chain (i.e., between manufacturers, haulers, recyclers, and disposal facilities)
Manufacturers need to know there is a defined market for a component before re-designing or changing product
Contamination issues - installation procedures
Lack of interest in carpet recycling by state recycling market development programs

Difficult for states to work together because of limits on spending tax dollars outside political boundaries

Dupont has processed and resold carpet fines, but not cost-effectively. Shaw Industries has utilized carpet fines for roadbeds, but is limited regionally. There is long-term potential to use carpet fines in synthetic fuels

Low value of carpet components ($CaCO_3$ = $0.01/lb, PP = $0.35/lb, latex = $0.55/lb)

Lack of business planning expertise by carpet recyclers

Business expertise is proprietary, leaving firms to rely on a few companies (e.g., Honeywell) for market information. CARE may help make business planning information more accessible

Potential Solution and Collaboration

- Encourage suppliers, retailers and installers to donate reusable carpet to reuse organizations
- Support collaborative or proprietary research on new markets (i.e., resin, textiles, hydro mulch medium, etc) among states and industry, make carpet eligible for state grants
- Establish industry technical review panel to assist with state grant making
- Facilitate partnerships between recyclers and the carpet industry on new technologies
- Support R&D into design options to promote source reduction, increase recyclability
- Support market research and economic analysis of realistic markets in cooperation with industry and other states
- Create, maintain and promote a document and resource list of carpet recyclers and products with recycled content carpet (Georgia State-Dalton Center for Business Assistance list)
- Develop criteria for selecting reuse and recycling rates and establish specific quantitative goals for the reuse, recycling, incineration and phase out of disposal for carpet

  Develop and promote procurement guidelines for recycled-content carpet and products containing recovered carpet and incorporate purchasing specifications into state contracts

  Conduct joint purchasing or leasing of recycled content carpet

  Provide technical assistance for regional IPC centers operating in conjunction with existing material recovery facilities

  Support an awards program to recognize manufacturers for their achievements in carpet recycling

  Collaborate with green building organizations to increase knowledge of carpet recycling

  Educate installers about the opportunities for carpet reuse and recycling

  Educate the general public about collection options, noting that curbside collection is not practical

  Establish regional collection infrastructure

  Establish tax incentives for use of recovered carpet; promote a tax incentive whereby donated inventory can be deducted up to twice its cost value (IRC Section 170(e))

  Support Midwestern Workgroup's dialogue with the carpet industry, implement and develop a resolution to support negotiated outcomes

  Work with new groups such as the Civil Engineering Research Foundation

  Define carpet recycling (so that it does not include waste-to-energy)

Other Discussion Items

The group discussed the difference between Nylon 6 and Nylon 6,6. At one point in time, Dupont manufactured both types of carpet. To prevent a possible monopoly of the industry, the federal government forced Dupont to spin off Nylon 6 to other companies such as Honeywell. Generally speaking, Nylon 6 is easier to recycle because there are fewer chemical bonds. Nylon 6,6 has a more

complex chemical structure and thus is more difficult to process for recycling. Because of its more complex structure, Nylon 6,6 is more durable, however. There is growing interest in expanding the recycling opportunities for Nylon 6,6. Currently, Dupont can break down Nylon 6,6 for recycling, but not cost-effectively. For a fee, Dupont collects limited amounts of 6,6 for specialized applications (e.g., car parts), but the market is small.